

REMARKS/ARGUMENTS

The Examiner rejects claim 15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 has been amended to overcome this rejection.

The Examiner rejects Claims 1 and 4-7 under 35 U.S.C. § 102(e) as being anticipated by U.S. 6,660,059 to Ji, et al.; claims 9-13 under 35 U.S.C. § 102(b) as being anticipated by U.S. 5,354,359 to Wan, et al.; claims 2-3 under 35 U.S.C. § 103(a) as being unpatentable over Ji '059 in view of U.S. 4,721,526 to Elmore; claims 15-22 under 35 U.S.C. § 103(a) as being unpatentable over Wan '359; and claims 24-28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4,369,061 to Kerley.

Rejection of Claims 1-7 and Newly Added Claims 38-48

Applicant respectfully contends that Ji, et al., and Elmore fail to teach or suggest at least the following italicized features of the pending independent claims 1 and 38:

1. A process for recovering a precious metal from a precious metal-containing material, comprising:
 - (a) providing a heap of the precious metal-containing material; and
 - (b) passing a thiosulfate lixiviant *and molecular oxygen* through the heap to form a pregnant leach solution comprising dissolved precious metals, *wherein the molecular oxygen is at a pressure greater than its ambient atmospheric pressure before introduction into the heap.*
38. A process for recovering a precious metal from a precious metal-containing material, comprising:
 - (a) providing a heap of the precious metal-containing material, *the lower portion of the heap comprising a network of aerating pipes;*
 - (b) passing a thiosulfate lixiviant through the heap to form a pregnant leach solution comprising dissolved precious metals;
 - (c) *while the thiosulfate lixiviant is passing through the heap, passing molecular oxygen through the network of aerating pipes and heap countercurrently to the flow of the thiosulfate lixiviant;* and
 - (d) thereafter recovering dissolved precious metal from the pregnant

thiosulfate lixiviant.

At the outset, Ji, et al., is not considered to be prior art. The present application was filed November 13, 2003, and claims priority to a provisional application filed November 15, 2002. Ji, et al., was filed May 11, 2001, and published July 18, 2002. Therefore, the only basis for Ji, et al., to be prior art is under 35 U.S.C. §102(e)(2).

Ji, et al., discuss a thiosulfate heap leach at col. 15, line 54, to col. 16, line 10. Fig. 4 shows molecular oxygen as being introduced during heap leaching but does not say how it is introduced. It could be through normal passage of the ambient air through the heap. It could be introduced in the leach solution itself. It could be introduced in the manner claimed. Ji, et al., fail to teach the italicized language above. Ji, et al., thus do not anticipate the independent claims.

Ji, et al., is further not prior art under 35 U.S.C. §103(c)(1), which states that subject matter developed by another person, which qualifies as prior art only under one or more subsections (e), (f), and (g) of section 102 shall not preclude patentability where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person. Apart from the fact that the same inventive group that is responsible for the heap leaching embodiment in Ji, et al., is also responsible for the heap leaching embodiment of the current application, both Ji, et al., and the present application are currently assigned to the same assignee, namely Placer Dome Technical Services Limited. At the time that the subject matter of the rejected claim 1 and newly added claim 38 were developed, the inventors of those claims were under an obligation to assign the invention thereof to Placer Dome Technical Services Limited.

Wan, et al., further discloses the use of a thiosulfate heap leach. Wan, et al., however, does not specifically disclose the introduction of molecular oxygen into the heap, let alone in the manner claimed, and further discloses that a free ammonia concentration of at least about 0.05M must be present. Wan, et al., discloses that the oxidizing agent is cupric tetrammine and not molecular oxygen. Nor is it obvious to use molecular oxygen as an oxidant. One of ordinary

skill in the art would understand molecular oxygen to cause decomposition of the thiosulfate to polythionates. Passing molecular oxygen forcefully through the heap countercurrently to the flow the lixiviant can cause free ammonia gas to be released into the atmosphere. This assertion is supported by Kerley, which states, at col. 6, lines 30-42, that the plant should be well engineered and operated so that it will experience low losses of ammonia from imperfect washing of the tails and vapor losses from the system. Thus, it is far from obvious based on Wan et al., to countercurrently introduce molecular oxygen into the heap.

Rejection of claims 9-13

Applicant respectfully contends that Wan, et al., fail to teach or suggest at least the following italicized features of the pending independent claim 9:

9. A process for recovering a precious metal from a carbonaceous precious metal-containing material, comprising:

(a) providing a refractory, carbonaceous precious metal-containing material; and

(b) contacting the carbonaceous precious metal-containing material with a thiosulfate-containing lixiviant, *wherein the lixiviant contains a blinding agent and wherein the blinding agent is selected from the group consisting of a hydrocarbon, an alcohol, an ester, an aldehyde, a lauryl sulfonate, a phosphate, guar gum, starch, cellulose, a metal salt, and a surfactant other than the foregoing compounds.*

The Examiner cites Wan, et al., as disclosing the use of cupric tetrammine as a blinding agent. Wan, et al., does disclose the presence, during the thiosulfate leach, of preg robbing carbon but specifically discloses the function of cupric tetrammine as an *oxidizing* agent. Wan,, et al., say nothing about using a blinding agent let alone cupric tetrammine's function as a blinding agent. In fact, cupric tetrammine will not act as a blinding agent.

Rejection of claims 15-22

Applicant respectfully contends that Wan, et al., fail to teach or suggest at least the following italicized features of the pending independent claim 15:

15. A process for recovering a precious metal from a precious metal-containing material, comprising:
- (a) providing a particulate precious metal-containing material;
 - (b) contacting the precious metal-containing material with a thiosulfate lixiviant and a calcium-containing material, *the calcium-containing material comprising a calcium carbonate*;
 - (c) after the contacting step, forming the precious metal-containing material into agglomerates, wherein the agglomerates comprise particles of the precious metal-containing material, thiosulfate lixiviant, and *calcium-containing material*;
 - (d) forming the agglomerates into a heap; and
 - (e) thereafter passing the thiosulfate lixiviant through the heap to form a pregnant leach solution in which most, if not all, of the precious metal content of the precious metal-containing material is dissolved.

While conceding that Wan, et al., do not disclose a calcium-containing material, the Examiner asserts that they do disclose the use of cement as a binding agent in agglomerate formation and that, based on this teaching, it would be obvious to use a calcium-containing binding agent. The calcium-containing agent, however, acts not as a binder but as a reactant with sulfate in the leach solution. The calcium reacts with and precipitates the sulfate and thereby controls sulfate levels in the system. Sulfate is commonly in the lixiviant due to the degradation of thiosulfate. Sulfate has been found to decrease precious metal recoveries, which is believed to be due to the increased instability of thiosulfate in the presence of sulfate. Higher levels of sulfates are believed to cause a more rapid rate of degradation of thiosulfate into polythionates and, ultimately, sulfate.

Even if the Examiner were correct, the claims now require the calcium-containing material to include a calcium carbonate, which is not mentioned in Wan, et al.

Rejection of claims 24-28

Applicant respectfully contends that Kerley fails to teach or suggest at least the following italicized features of the pending independent claim 24:

24. A process for recovering a precious metal from a precious metal-containing material, comprising:
- (a) contacting a thiosulfate lixiviant with a precious metal-containing material to form a pregnant leach solution, the pregnant leach solution comprising a dissolved precious metal, thiosulfate, polythionate, and sulfate; and
 - (b) *maintaining a dissolved sulfate concentration in the pregnant leach solution of no more than about 150 g/L.*

Kerley states at col. 6, line 64, to col. 7, line 2, as follows:

The sulfate ion (SO₄²⁻) is neutral in this leaching system, however, it is a decomposition product in the oxidation of thiosulfate, therefore, it could build up and adversely affect the activity of the solution. A small addition of lime is recommended if such a buildup should occur, thereby causing its precipitation as gypsum whereby it will be removed with the leached tails.

As can be seen from the above language, Kerley is ambiguous on the effect of sulfate. On the one hand, he states that it is “neutral” in the leaching system. On the other, he states that sulfate may “adversely affect the activity of the solution” but fails to state what activity is affected adversely, how the activity is affected adversely, or why the activity is affected adversely. Moreover, Kerley is silent on the precise maximum level of sulfate.

Contrary to the Examiner’s conclusions, one of ordinary skill in the art, after reading Kerley, would not only be confused about whether or not to control sulfate levels but also at what level the sulfate should be controlled at. A skilled artisan could conclude, based on Kerley, that it is better to let sulfate build up in the system as it could actually decelerate the degradation of thiosulfate through a shift in the equilibric conditions. He could conclude that the greater the concentration of sulfate is, the slower thiosulfate will form sulfate. As noted, Kerley states that sulfates have no adverse affect on the leaching mechanism itself.

Accordingly, the pending claims are allowable.

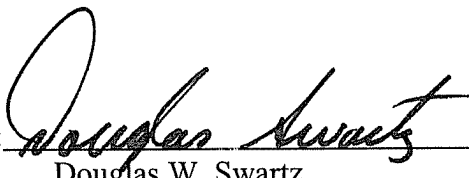
Application Serial No. 10/713,640
Reply to Office Action of July 28, 2006

The dependent claims provide further reasons for allowance.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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